

WHAT IS CLAIMED IS:

1. A semiconductor apparatus, comprising:
a semiconductor substrate;
a field oxide film formed in a surface of the semiconductor substrate, the field oxide film having an aperture section;
an electrode formed on the field oxide film; and
a penetration electrode electrically connected to the electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate,
the hole being formed in the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate.
2. The penetration electrode as set forth in Claim 1, wherein:
the penetration electrode is formed in a field area of the surface of the semiconductor substrate.
3. The penetration electrode as set forth in Claim 1, wherein:
the electrode has an aperture section,
the penetration electrode is connected to said electrode in the aperture section of the electrode.

4. The penetration electrode as set forth in Claim 3, wherein:

the aperture section of the field oxide film is formed in the aperture section of the electrode, when perpendicularly viewing the semiconductor substrate.

5. The semiconductor apparatus as set forth in Claim 1, wherein:

the penetration electrode includes an insulating film formed on an internal surface of the hole.

6. The semiconductor apparatus as set forth in Claim 5, wherein:

the penetration electrode includes an electrically conductive film on the insulating film that is formed on the internal surface of the hole.

7. The semiconductor apparatus as set forth in Claim 1, wherein:

the penetration electrode includes a hole-filling section formed in the hole.

8. The semiconductor apparatus as set forth in Claim 7, wherein:

the hole-filling section is made of an insulating

material.

9. The semiconductor apparatus as set forth in Claim 7, wherein:

the hole-filling section is made of an electrically conductive material.

10. A method for manufacturing a semiconductor apparatus including (i) a field oxide film formed in a surface of a semiconductor substrate, (ii) an electrode formed on the field oxide film, and (iii) a penetration electrode that penetrates the field oxide film and the semiconductor substrate, respectively, and that is electrically connected to the electrode,

said method, comprising the steps of:

(a) forming an aperture section in the field oxide film so that the semiconductor substrate is exposed in the aperture section;

(b) forming a hole in an area of the semiconductor substrate, the area being exposed in the aperture section of the field oxide film;

(c) forming an insulating film on an internal surface of the hole, and

(d) forming an electrically conductive film on the insulating film formed,

the steps (c) and (d) forming the penetration electrode.

11. The method for manufacturing a semiconductor as set forth in Claim 10, wherein:

the step (c) includes the step of:

(e) printing an insulating material under a certain air pressure so that the hole is covered, and then increasing the air pressure more than the certain air pressure so that a film made of the insulating material is formed on the internal surface of the hole.

12. The method as set forth in Claim 11, wherein:
the step (e) is repeated more than once.

13. The method as set forth in Claim 11, wherein:
the step (d) includes the step of:

(f) printing an electrically conductive material under a certain air pressure so that the hole is covered, and then increasing the air pressure more than the certain air pressure so that a layer made of the electrically conductive layer is formed on the internal surface of the hole.

14. The production method of a semiconductor as set forth in Claim 13, wherein:

the step (f) is repeated more than once.

15. The production method of a semiconductor as set forth in Claim 10, further comprising the step of:

(g) forming a hole-filling section in the hole,

the step (g) including the step of:

(h) printing an insulating material or an electrically conductive material under a certain air pressure so that the hole is covered, and then increasing the air pressure more than the certain air pressure so that the hole is filled with the insulating material or the electrically conductive material.

16. The method as set forth in Claim 15, wherein:

the step (h) is repeated more than once so as to fill the hole with the insulating material or the electrically conductive material.